

The Economic and Social Review, Vol. 38, No. 1, Spring, 2007, pp. 63–84

Recreational Pursuits on Marginal Farm Land: A Discrete-Choice Model of Irish Farm Commonage Recreation

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Abstract: In the last decade the demand for rural recreation has increased in Ireland as the population has become increasingly urbanised. Increased affluence, mobility and changing values have also brought new demands with respect to landscape, conservation, heritage and recreation, with a greater emphasis on consumption demands for goods and services in rural areas. This paper's contribution to the understanding of outdoor recreational pursuits in Ireland is based on the estimation of the first farmland recreation demand function. We use this empirical work to investigate the more general conflict between countryside recreational pursuits and farming activity. Through the estimation of a travel cost model, the study derives the mean willingness to pay of the average outdoors enthusiast using a farm commonage site in Co. Galway, Ireland and an estimate of the gross economic value of the site as a recreational resource. The result indicates the high value of Irish farmland from a recreational amenity perspective.

I INTRODUCTION

The rural countryside has always been a source of recreation for rural and urban dwellers alike. In the last decade the demand for rural recreation has increased in Ireland as the population has become increasingly urbanised. It is also increasingly recognised that the socio-economic character of rural

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Paper presented at the Twentieth Annual Conference of the Irish Economic Association, Bunclody, Co. Wexford, 2006.

areas is undergoing fundamental change (Marsden, 1999 and Garrod *et al.*, 2006). Increased affluence, mobility, ageing of the population and changing values have brought new demands with respect to landscape, conservation, heritage and recreation, with a greater emphasis on consumption demands for goods and services in rural areas. With the increased demand and interest in country pursuits, a number of issues about public access have emerged. There has been considerable debate in relation to the issue in Ireland over recent years and it is recognised that there are legitimate concerns for both landowners and users (Irish Department of Agriculture and Food, 2004). This study conveys the findings of an empirical investigation into the recreational use of low land commonage in the west of Ireland. There is an extensive literature on the exploitation and valuation of common pool resources based on their extractive use (Hardin, 1968; Bromley, 1991; Ostrom, 2000). However, the valuation of common pool resources in a post-productivist context, where consumption-related demands for rural services are displacing traditional goods is less well documented.

Commonage in Ireland covers 426,124 hectares and involves about 11,837 farmers (Bleasdale and Sheehy-Skeffington, 1995). Historically, Irish tenants with very small holdings were given commonage grazing rights by the state. Commonage thus refers to unenclosed land on which two or more farmers have pasture rights held in common (Lyall, 2000). Traditionally, economic activities on commonages included extensive cattle and sheep grazing and hunting (Bleasdale and Sheehy-Skeffington, 1995; Butler, 2000). In Ireland most commonages are located in remoter coastal and upland mountainous regions and their outstanding recreation appeal has given rise to increased demands for a wide range of open-air activities including hill-walking, mountaineering, mountain biking (upland areas), surfing and horse riding (Phillips and Tubridy, 1994; Nugent, 1996; Dunne and O'Connell, 2000). This is now thought to have important economic benefits for promoting rural tourism.

A recent paper by Buckley and van Rensburg (2006) quantified the opportunity costs associated with recreation on farm commonage – namely the commercial value of sheep and cattle grazing on commonage land.¹ The study found that only 23 per cent of farms showed a positive gross margin in a post-decoupling scenario. The return to commonage across their sample of commonage farmers was heavily dependant on premia. The authors concluded

¹ It is important to state however that the two land uses are not total substitutes; the recreational use of farmland does not imply the cessation of agricultural use. There may be some cost to commercial farming from recreation, but it is unlikely to be eliminated.

that if this element was removed then ... *the economics of livestock activity in these marginal areas is questionable*. As Buckley and van Rensburg (2006) show, many commonages are found in areas bypassed by recent economic growth, where farming continues to be a marginal activity, and which have endured significant population decline. Furthermore, relative to traditional agricultural activities, outdoor recreation activities may represent a more economically efficient use of commonage resources. Consequently, in commonage areas, policy makers are recognising the value of open-air outdoor recreation as a means of supporting rural incomes and the Rural Development Plan through niche tourism; environmentally guided farming; rural diversification; job creation, and rural regeneration. However, as will be discussed in the next section farmers have a mixed attitude to recreational users on their land and to whether or not “right to roam” legislation such as was introduced in Scotland in 2003 should be introduced in Ireland as well.

In February 2005 the Scottish Outdoor Access Code came into operation under the Land Reform (Scotland) Act 2003 and as a result everyone is now able to enjoy a statutory right of “responsible access” for walking, cycling, canoeing, horse riding, wild camping and mountain biking. The new statutory right to roam is broad ranging and only excludes access to farm buildings and farmyards, quarries, railway property and airfields. Land, which is growing crops, is also off limits but access along field margins, along tramlines (tractor drills) and between rows of vegetables was within the right so long as no damage or disturbance was done. This legislation potentially gives Scotland the best framework for outdoor access in Europe. It needs to be borne in mind however that these current land reforms in Scotland are influenced by that country’s history of dispossessed communities and absentee landlords. As Horsburgh (2003) points out it is wrong to say ... *this approach to land management worked in country x, so country y should do the same*. Each nation needs to find its own approach.

This study adds to the literature by being the first of its kind that attempts to put a value on recreational activity carried out by the general public on privately owned Irish farmland. The remainder of the paper is organised as follows: first we discuss rural recreation and the countryside access situation in Ireland. Following this, the travel cost method and its application to the valuation of non-market environmental public goods is outlined. Next we give some background to the survey of visitors to the Irish commonage site and discuss the execution of the survey. The empirical estimation procedure is then reviewed. We then present the results of the survey and conclude with a discussion on the economic and policy implications of the study findings and some recommendations for further research.

II RURAL RECREATION AND THE COUNTRYSIDE ACCESS SITUATION IN IRELAND

All land in Ireland is owned either by private landowners or the Irish government. Even the site under investigation in this paper, referred to as commonage, is essentially private land owned jointly by a number of people. Recreational users do not have a legal right of entry to land in Ireland; access is at the discretion of the landowner. While the great majority of Irish landowners continue to facilitate recreational users, in recent times there has been an increase in the closure of lands. There are various reasons underlying this change in farmers' attitude to recreational users on their land. These include fear of litigation, poor behaviour by some recreational users, a decline in the economic viability of smaller farms and frustration that the farming community or landowners are the one party not to gain any direct benefit from commercialised recreational use of their land.

Government supported initiatives to promote public access to the countryside in Ireland include The Irish Sports Council's "National Waymarked Ways", the Slí na Sláinte walking routes under the Irish Heart Foundation and forest walks run by Coillte (the state owned forestry company). The National Waymarked Ways and Slí na Sláinte implement "wayleave" agreements between landowners, local development committees and local authorities. This process engages local interests as well as enhancing public access and improving outdoor recreational opportunities. Coillte has an open forest policy, which encourages the use of forest walks. With a view to maximising the benefit of recreational activity to rural communities and providing a framework for the development of this sector, the Irish Department for Community, Rural and Gaeltacht Affairs, established Comhairle na Tuaithe in January 2004. Comhairle na Tuaithe is addressing three priority issues: access to the countryside; the development of a countryside code and the development of a National Countryside Recreation Strategy.

From a tourism prospective, uninterrupted access to the Irish countryside by recreational users is imperative as countryside pursuits are the bedrock of Ireland's Special Interests Tourism. Within the Special Interests Tourism category "Walking Tourism" is Ireland's largest niche area delivering the highest numbers of visitors. Tourism revenue as a whole in Ireland increased from €567.1 million to €690.8 million between 2000 and 2003 (Failte, Ireland 2004). There were an estimated 90,000 visitors that took part in outdoor walking activities in the Irish uplands (66,600 of whom were from Ireland and the balance 23,400, from abroad) during 1997 (Bergin and O'Rathaille, 1999). According to Failte Ireland figures (www.failteireland.ie/research) the number

of visitors which took part in outdoor walking activities in Ireland, increased to an estimated 259,000 visitors by 2004, bringing with them an estimated tourism revenue of €170 million. In total, 93 per cent of this figure is spent outside the greater Dublin area, thus having a substantial impact on the Irish rural economy. Fáilte Ireland's data also shows that cycling tourism is worth about €80 million annually to the Irish economy. It is obvious from these figures that continued access to the countryside for walking is essential to maintaining and developing the rural tourism sector. As the Irish Tourism Board state ... *without agreed access to the countryside, Ireland does not have a Walking Product to 'market'* (Failte Ireland, 2003).

One recent study by Agri Aware (Bogue, 2005) was commissioned in order to determine the views of the public on their use of the countryside and their opinions relating to public access to property. The study found that over twice as many respondents rated farmers as welcoming to countryside visitors as those who considered them unwelcoming. The study also found that only 6 per cent of respondents had personally experienced problems while pursuing leisure activities in the previous 12 months, while 31 per cent were aware that other people had experienced problems in that period. It was also found that the majority of those surveyed believed that the Government should incur the costs involved in guaranteeing public access to private land. It is worth noting that it was the urban dwellers who were most in favour of the Government covering the costs.

Another study commissioned jointly by the Irish Sports Council and Coillte in 2005 (Fitzpatrick Associates, 2005) to look at the value of recreational trails and forest recreation estimated the direct expenditure by Irish trail users on items such as food, drink, accommodation and trail equipment at €307 million annually, while the non-market value of trails was found to be €95 million. The direct economic impact of forest recreation by Irish residents was estimated to be €268 million, while the non-market value of forest recreation was estimated at €97 million. One of the key findings of the Coillte/Irish Sports Council commissioned study was that the economic benefits of trail and forest recreation by domestic visitors are much greater than those generated by overseas visitors.

In a separate survey, Curtis and Williams (2002) found that approximately three-quarters of the adult population in Ireland (2.2 million) participate in walking for recreational purposes and that this far outweighs other forms of sporting activity or exercise. Curtis and Williams (2002) estimated that 503,000 (16.7 per cent of the population) people undertook walks of 1-4 hours duration and that half-day and full-day walkers spent approximately €7.2 million on food, drink and entry fees during 2002. The authors also estimated annual expenditure on recreational walking gear and equipment at €76

million during 2002. The health benefits of walking and cycling are also increasingly being given recognition (Wang *et al.*, 2004).

The investigation of the economic value associated with improved public access to commonage that is discussed in this paper presents a situation of considerable interest from an economic and policy perspective. It will also, it is hoped, add considerably to the ... *public access to the Irish countryside* debate. Although policymakers are aware of the economic opportunities associated with open-air outdoor recreation activities, rational public decision making on financing the improvement of public access requires that the economic benefits associated with rural recreation pursuits should be clearly identified and valued. Furthermore, the provision of new schemes for walking and rights of way also depends on the supply of public funds, which must be justified to the public exchequer, the European Commission and the public at large. The results of this paper may facilitate such a justification.

III MODEL SPECIFICATION

The Travel Cost Model (TCM) is a well established technique for valuing non-market benefits which has been widely documented in the economics literature (Loomis *et al.*, 2000; Font, 2000). Despite the enormous public interest in farm land as a recreational resource, the application of valuation techniques to estimate public good values associated with walking and improved public access on farmland in Ireland and elsewhere remains limited (Crabtree *et al.*, 2000). Previous studies on non-market valuation of recreational activities in Ireland have been confined to studies on forests (Clinch and Murphy, 2001; Scarpa *et al.*, 2000, Fitzpatrick Associates, 2005), kayaking (Hynes and Hanley, 2006) and angling (Davis and O'Neill, 1992 and Curtis, 2003). This paper aims to fill this gap in the literature by investigating the non-market economic values associated with outdoor recreation activities on a farm commonage site in Connemara, Ireland using the travel cost approach.

The TCM is widely used by economists to estimate user benefits from visits to recreational areas. It is an indirect valuation technique which uses travel expenditure in getting to a site as a surrogate measure for the "price" paid by an individual visitor in order to use the site in question. The price faced by recreationalists is the cost of access to the commonage site (mainly the time and money costs of travel from home to site), and the quantity demanded per year is the number of recreation trips they make to the commonage site. A demand equation can then be estimated, from which consumer surplus can be derived. Economic value (consumer surplus) of a

particular output of a public good such as commonage site recreation can be found by estimating the consumer demand curve for that output. It is important to note that the consumer surplus figure is a measure of the user value of the commonage site only, and does not necessarily measure the site's environmental or intrinsic value (McKean and Walsh, 1986).

Most economists have preferred to use the TCM to estimate economic use values associated with sites that are used for recreation, as it is based on observed market behaviour of a cross-section of users in response to the cost of travel. The TCM is well suited for the valuation of recreational activities on sites such as farm commonage as they require significant travel and attract many participants for repeat visits. The TCM is also attractive because it is a relatively simple and cost-effective approach to measuring the economic value associated with recreational use of commonage areas. The count data travel-cost model has been widely used to estimate demand for recreational amenities. Examples include Loomis *et al.* (2000) for whale watching; Chakraborty and Keith (2000) for mountain biking; Font (2000) for national park recreation; Curtis (2002) for recreational fishing; Offenbach and Goodwin (1994) for hunting; and Hynes and Hanley (2006) for kayaking.

Given the practical constraints on the scope of the current project and the limited sample size, a very basic approach was taken to the specification of the TCM. For example, substitution among sites within the study area was not considered. If substitution to other sites does play an important role in determining the demand for trips to the commonage area, then the TCM presented here will tend to overstate actual willingness to pay. In the final specification, annual number of trips was assumed to be a function of travel expenses, income, discretionary time available, age, gender, number of years of participating at one's preferred outdoors pursuit and education.

Travel cost should reveal itself as being the critical driving factor behind the demand for trips to the commonage area. Demographic factors such as gender and age generally have less dramatic impacts on demand, but can be important in explaining why different groups respond differently to changes in price or income (McKean and Taylor, 2000). Variation among recreationalists in travel cost from home to commonage site (i.e., price variation) creates the farm commonage recreation demand function. Non-monetary factors, such as obligation free time and years of recreation experience will also affect the number of visits per year. The statistical demand curve should incorporate all the factors which affect the public's willingness-to-pay for recreation at the commonage site. The empirical estimation of the Commonage Recreation TCM is provided in Section V.

IV DATA AND SURVEY DESIGN

The data analysed in this paper were generated from a survey of visitors to Roundstone Commonage, in Connemara, County Galway, Ireland. The Roundstone commonage site is owned and managed by a group of 16 shareholders who use the land for grazing but allow freedom of access to the public for walking and other beach related recreation activities. The commonage site is situated on an outcrop of land that separates Dogs Bay and Gurteen Bay. The commonage offers visitors a highly distinctive landscape, including a variety of walks across open machair² grassland, coastal edges and exposed granite (Bassett and Curtis, 1985). It is estimated that 'machair grassland' is restricted to about 25,000 hectares worldwide, with 17,500 hectares in Scotland and the remainder in western Ireland, so that world distribution is very restricted. The largest extents in Scotland are in the Western Isles, Coll and Orkney. The full (global) geographical extent of the wider 'machair systems'³ is believed to be in the region of 40,000 hectares, with some 30,000 hectares in Scotland and 10,000 hectares in Ireland (Angus and Elliott, 1992).

The survey interviews were conducted face-to-face on the commonage. Respondents at the site were randomly selected to complete the survey. A total of 265 individuals were interviewed. Each interview lasted approximately 15 minutes and followed a standard format. The questionnaire was piloted over 5 days at the commonage during May 2004 and this aided in the design of the final survey. This was followed by the main survey which took place at Roundstone Commonage during the months of July and August 2004. In the survey, visitors were questioned about the associated travel costs of their visit and reasons for selecting the Roundstone commonage as their travel destination. The survey also included questions covering general information: visitor status; length of visit; whether the visit was the main purpose of their day out; frequency of visits to the commonage; and activities undertaken. Finally, all respondents were asked a series of questions on household characteristics in order to determine which socio-economic variables affect the number of trips taken.

² A 'machair' refers to a relatively flat and low lying sand plain formed by dry and wet (seasonally waterlogged) short-turf grasslands above impermeable bedrock, a habitat termed 'machair grassland'. Machair is a distinctive type of coastal grassland found in western Ireland and in the north and west of Scotland.

³ Machairs can also cover the beach zone, mobile and semi-fixed foredunes, dune slacks, fens, swamps, lochs (some of them brackish), saltmarsh, and sand blanketing adjacent hillslopes, together forming the 'machair system'.

In calculating the travel cost to the commonage area, the Automobile Association (AA) of Ireland's calculations for motoring expenses were used. It is assumed here that recreationalists only take into account the operating expenses when deciding to make a trip to the commonage area or not. Considering that the standing charges will have to be paid regardless of whether a trip is made or not and the fact that the operating cost of the car is directly dependent on miles travelled, this is not an unrealistic assumption. For these reasons, the AA estimate for operating cost per mile of €0.25 is taken as the recreationalists travel cost per mile in this study. Table 1 summarises some of the survey responses and highlights some of the variables included in the TCM analysis. The sample of 241 observations represents the total number of surveys that were used in the empirical analysis. Just 17 of the total 265 surveys were returned incomplete, lacking some portion of the data that was needed to be included in the final model specification.

Table 1: *Summary Statistics*

<i>Variable</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Annual Number of Trips to Commonage Area	3.51	5.46	1	40.00
Distance Travelled from Home to Commonage Area	19.06	24.83	0.01	186.10
Travel Cost	9.67	12.54	0.00	93.05
Discretionary Time (DT) Available	76.12	78.77	0.00	365.00
Age	41.00	12.48	15.00	60.00
Income	51562.50	27961.81	10000.00	90000.00
Experience	15.25	10.80	0.50	50.00
Number of Children	0.71	0.48	0.00	3.00

The majority of the surveys excluded from the analysis lacked information on either the distance or time required for travel to the commonage site. Results from the survey indicate that on average visitors travelled over 19 miles on the day in question to visit the site. In total 68.3 per cent of the sample were Irish, a further 28.6 per cent classified themselves as European, while 3.1 per cent were from outside Europe⁴. The average visitor indicated they would be spending over 3.5 days in the area. This was dispersed between day trippers and those on longer term vacations. Table 2 below outlines the

⁴ The travel distance used to calculate travel costs for visitors from outside the island of Ireland was the distance the individual had travelled from their previous night's accommodation in Ireland.

main reason for visiting the site. It should be noted that some visitors indicated more than one reason why they chose to visit the site. In total over 72.2 per cent of those interviewed indicated sunbathing as a primary reason⁵. A further 42.6 percent indicated swimming while over 36 per cent suggested walking.

Table 2: *Main Reasons for Visiting the Commonage Site*

<i>Activity</i>	<i>Percentage of Respondents %</i>
Sunbathing	72.2
Swimming	42.6
Walking	36.1
Local Access	12
Surfing	7.4
Sailing	2.8
Golf	2.8
Fishing	2.8
Kayaking	0.9
No particular reason/Other	11.1

Table 3 outlines the main characteristics which attracted visitors to the site in summer 2004. Over 86 per cent visited the site for access to the beach, while 63 per cent indicated the scenic view as an important factor. Other important factors as outlined by Table 2 were pathways, the unspoilt environment, good waves/wind for water-sports and the surrounding vegetation. The safeness and tranquillity of the location also showed up as important. The average income for the sample is relatively high at €51,562. The average age for the sample was found to be 41 years (see Table 1). The commonage area in this study is situated in a remote area of Connemara not on a regular public transport route. For this reason it is to be assumed that only those who can afford to have their own private means of transport will visit the site. Also, it would not be unrealistic to assume that the more sedate activity of sunbathing or exploring a lowland commonage area (in comparison to an adventure sport activity) is something that an older demographic group would probably participate in. For these reasons, the relatively high age and income variables are not unexpected.

⁵ Although this activity takes part on the beach, access to the beach requires access through the farm commonage site.

Table 3: *Main Characteristics which Attracted Visitors to the Site*

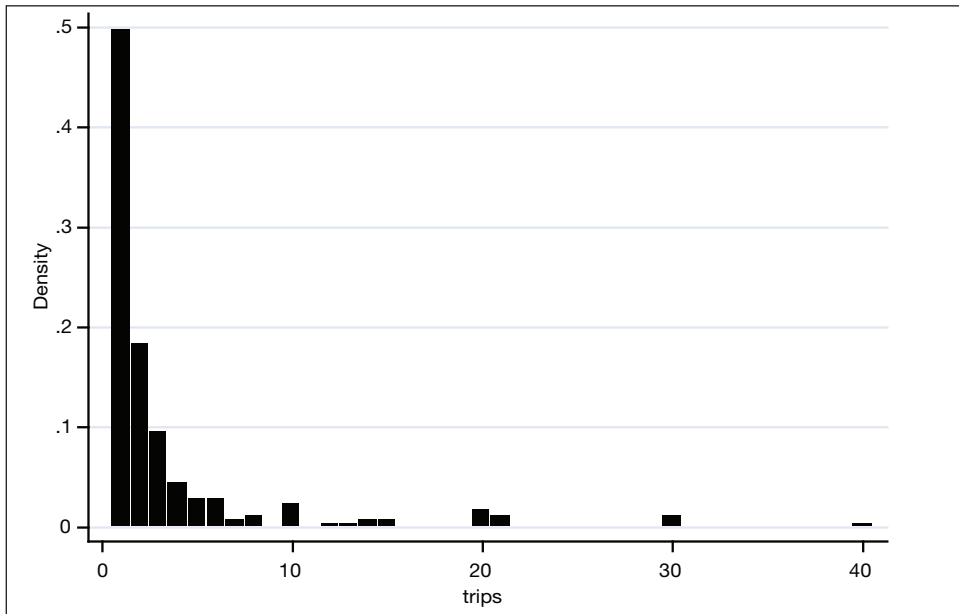
<i>Attribute</i>	<i>Percentage of Respondents %</i>
Beach	86.1
Views	63.0
Paths	17.6
Clean / Unspoilt	13
Good Waves / Wind	5.6
Vegetation	5.6
Safe	3.7
Quietness	2.8
Other	9.3

V EMPIRICAL ESTIMATION

Travel Cost Count Data models are typically estimated based on either the Poisson or negative binomial distributions. Such an approach is consistent with the discrete nature of the dependent variable, i.e. the annual number of trips. The number of trips taken in any given year is reported as a discrete, non-negative integer value. Thus, application of the standard distributional assumptions (e.g., normality) is inappropriate because the dependent variable in the TCM cannot take on a continuous range of values. This is evident from the histogram in Figure 1 where it can be seen that a discrete probability distribution will result in a better model specification.

Following the work of Creel and Loomis (1990) and Grogger and Carson (1991), the current model was estimated under the assumption that the observed number of trips can be described by a negative binomial distribution. This count data distribution is a generalisation of the Poisson distribution. The Poisson model has been criticised because of its implicit assumption that the conditional mean of T (in our case T is the expected number of trips to the commonage area demanded) equal the variance of T (Greene, 1993). This mean-variance equality has proven problematic in applied work since real data frequently exhibits “overdispersion”; that is where the conditional variance is greater than the conditional mean. Take recreationalists at this commonage site for example. The average number of trips taken to the commonage in one year was 3.51 but the variance was almost nine times that at 29.86.

Therefore, if we fit a Poisson model to the commonage data, we will be imposing the mean-variance equality restriction on the estimation. We will effectively be requiring the variance to be less than it really is. As a result the

Figure 1: *Distribution of Recreational Trips to the Commonage Area*

true variability in the data will be underestimated. This will lead us to underestimate our standard errors, and so to overestimate the degree of precision in our coefficients (Cameron and Trivedi, 1986). The Poisson distribution has been generalised to take into account this problem of over dispersion. The generalisation most often used in the literature on count data models for recreational demand is, as already mentioned, the negative binomial probability distribution (Grogger and Carson, 1991; Englin and Shonkwiler, 1995) where an individual, unobserved effect is introduced into the conditional mean.

There is one particular issue that needs to be addressed with on-site collected data and that is the fact that we have no observations for individuals who made zero trips to the commonage. The survey dataset only reflect the behaviour of individuals who took at least a single trip to the study area. While this observation may be obvious, it has important implications for the empirical specification of the TCM. Exclusion of individuals who chose not to make a trip implies that the data have been systematically truncated. If this truncation is not recognised, the resulting parameter estimates will be biased. Moreover, this bias will extend to the estimates of consumer surplus that are derived from these parameters. To avoid this problem, one must modify the negative binomial distribution to reflect the fact that T_i is only observed when $T_i > 0$. Following Grogger and Carson (1991), we use the negative binomial probability distribution adjusted to account for truncated counts.

A truncated Poisson distribution can also be used to model the data generating process that underlies the discrete, non-zero values observed in the sample. Although this model can be somewhat easier to estimate, it once again imposes the restriction that the conditional mean of the dependent variable, λ , is equal to the conditional variance. Comparisons of the results obtained using the standard Poisson, truncated Poisson and standard negative binomial distribution to our preferred truncated negative binomial distribution model are shown in Table 4.

Table 4: *Model Parameter Estimates*

	<i>Poisson</i>	<i>Negative Binomial</i>	<i>Truncated Poisson</i>	<i>Truncated Negative Binomial</i>
Travel Cost	-0.031 (6.85)**	-0.022 (3.47)**	-0.041 (7.04)**	-0.031 (2.62)**
Income	-0.00003 (5.67)**	-0.00003 (2.65)**	-0.00003 (5.92)**	-0.00003 (2.10)*
Discretionary Time Available	-0.001 (2.22)*	-0.001 -1.1	-0.002 (2.60)**	-0.003 -1.24
Experience***	-0.074 (6.60)**	-0.066 (3.00)**	-0.084 (7.08)**	-0.133 (2.62)**
Experience2	0.002 (7.71)**	0.002 (3.39)**	0.002 (8.20)**	0.003 (2.93)**
Age	-0.127 (3.03)**	-0.101 -1.19	-0.134 (3.01)**	-0.098 -0.5
Income2	0.0000003 (6.35)**	0.0000003 (3.07)**	0.0000003 (6.57)**	0.0000003 (2.42)*
Education (1= third level)	-0.089 (2.43)*	-0.11 -1.56	-0.106 (2.66)**	-0.244 1.59
Purpose^	0.809 (4.13)**	0.8 (2.59)**	1.025 (4.08)**	1.78 (2.86)**
Gender (1=male)	-0.365 (4.39)**	-0.481 (3.04)**	-0.428 (4.65)**	-1.179 (3.29)**
Constant	2.818 (10.13)**	2.716 (5.57)**	2.877 (8.69)**	-8.298 (8.26)**
α		0.6		0.63
Log-Likelihood	-322.97	-395.18	-530.87	-332.98

Absolute value of z statistics in parenthesis.

** indicates significance at 5 per cent.

* indicates significance at 1 per cent.

*** Number of years in pursuit of ones countryside recreational activity.

^ Reason for being in the area, where 0 indicates "visited commonage area because I was in the area on other business and 1 indicates "came to the area with the sole purpose of visiting the commonage".

VI MODEL RESULTS

Parameter estimates for the commonage TCM are presented in Table 4. Four alternative specifications of the demand equation were estimated. These include the Poisson, the negative binomial model, the truncated Poisson and finally the truncated negative binomial model. Although these alternative models gave results similar in magnitude and with the same signs, the Poisson was rejected in favour of the negative binomial model, as this was the model found to best fit the data. The value of the maximised log-likelihood was -397.17 for our chosen truncated negative binomial model whereas it was -551.13 for the Poisson model.

In our chosen truncated negative binomial model⁶ α , the overdispersion parameter, is 0.63. It is positive and significant indicating that the data is overdispersed. In order to test the hypothesis that $\alpha = 0$ (and therefore indicating that the Poisson model would be more appropriate) a likelihood ratio-test is performed. The χ^2 value of 311.92 asserts that the probability that one would observe these data conditional on $\alpha = 0$ is virtually zero, i.e. conditional on the process being Poisson. This indicates that the negative binomial distribution is the more appropriate one to use. The model's estimate of the mean number of commonage recreational trips demanded is 3.78. This is very close to the actual mean of 3.51 trips observed in the sample.

The marginal effect of covariates on mean commonage trips taken is given by:

$$\frac{\partial E(T|X)}{\partial x_i} = (1 + \alpha) \lambda_i \beta_i \quad (1)$$

λ_i is the predicted number of trips taken (3.51), β are parameters estimated from the observed sample and α is referred to as an overdispersion parameter. For every €10 increase in the travel cost of a trip, the number of trips per year demanded falls by 1.77. The estimated coefficients for both travel costs and income are of the expected sign and significant at the 95 per cent level of confidence. The income coefficient is significant and has a negative sign but is very small at -0.0000361. While this result may appear strange it is not uncommon to encounter small (and in many cases counter-intuitively negative) income effects in recreational travel cost demand models (Chakraborty and Keith, 2000 and Curtis, 2002). The variable denoting years

⁶ All results discussed in this section are based on the parameters from the truncated negative binomial model (column 4 in Table 4).

of experience⁷ is significant at the 5 per cent level and indicates that the number of trips taken is quadratic in experience. The experience coefficient is negative indicating that the fewer years an individual has been pursuing their main outdoor activity the higher their demand for trips to the commonage area will be. This may indicate that an individual's enthusiasm for their particular outdoor activity wanes after a number of years.

The variable indicating main reason for being in the area also has a significant impact on the demand for commonage recreational trips. This indicates that the individuals who came to the area with the sole purpose of visiting the commonage has a positive influence on the number of trips taken to the commonage. Compared with those individuals who visit the site because they are in the area on other business, individuals who came to the area with the sole purpose of visiting the commonage will make 10.18 more trips per year to use the commonage area for recreational purposes. The gender variable (significant at the 95 per cent level of confidence) indicates that men are likely to make 6.6 less trips per year to the commonage site than females. The discretionary or obligation free time variable in our model was surprisingly found to be insignificant and of an unexpected sign. A priori, one would assume that more discretionary time available to an individual the more trips that person will make to the commonage area. This was not found to be the case for our sample of recreationalists.

The goal of this analysis was not merely to estimate the parameters of the commonage travel cost model but rather to use these parameter estimates as an input in calculating the economic value of recreation on the farm commonage site. Consumers' surplus was estimated following McKean and Taylor (2000) and Hellerstein and Mendelsohn (1993), for consumer utility (satisfaction) maximisation subject to an income constraint, and where trips are a non-negative integer. Hellerstein and Mendelsohn show that the conventional formula to find consumer surplus for a semi-log model also holds for the case of the integer constrained quantity demanded variable. They show that the expected value of consumer surplus, $E(CS)$, derived from count models can be calculated as $E(CS) = E(T_i | x_i) / \beta_p = \hat{\lambda}_i / (\beta_p)$ where $\hat{\lambda}_i$ is the expected number of trips, and β_p is the price (i.e., travel cost) coefficient. The consumer's surplus per-trip ($E(CS)$) is simply equal to $1 / -\beta_p$.

⁷ The variable Years of Experience was derived from the survey question "How many years have you been pursuing your main outdoor activity?" The experience variable has a 45 per cent correlation with age, indicating that it is not necessarily the case (for our sample) that the older a person is, the more likely that person has accumulated experience. The interpretation of the Years of Experience variable takes into account the main stated reasons for visiting the site (sunbathing and beach) which would help to explain the negative experience coefficient.

Application of the truncated negative binomial regression and using recreationalist-reported travel distance multiplied by €0.25 per mile per person plus 25 per cent of an individual's gross hourly wage (which represents the opportunity cost of leisure time) to estimate travel costs, resulted in an estimated coefficient of -0.031 on travel cost.⁸ Consumer surplus per individual per trip is the reciprocal or €32.26. The population estimate of per-trip consumer surplus is estimated with 95 per cent confidence to be between €18.87 and €129.44. Average trips per year in our full 241-person sample were 3.51 giving a total consumer surplus per individual per year figure of €113.20 per year.

The annual recreation value of the commonage area for our sample of 241 individuals is €27,280 per year. The total annual recreational value of the commonage site for all individuals requires knowledge of the total population which frequents the commonage area in any given year. The commonage shareholders estimated that an average of 350 individuals were on the commonage site each day through the period June to September. Given that these are the four main months when visitors frequent this site (due mainly to weather constraints) the lower bound estimate of the total number of visitors was calculated at 43,400. This means that as a recreational amenity the lowland commonage site investigated in this paper has a non-market value of €1.4 million per annum. The population estimate of total consumer surplus is estimated with 95 per cent confidence to be between €0.819 and €5.635 million. This result indicates the high value of the Roundstone commonage site as a recreational resource, even ignoring non-use values from preservation.

This study on recreational pursuits on farmland is the first of its type carried out in Ireland. Other discrete choice modeling studies on recreational pursuits in Ireland have been carried out but none were concerned with "on-farm" recreational activities. Having said that, two previous studies in Ireland have used the techniques employed in this paper to analyse sporting activities that required access *through* farmland in Ireland. The first involved an

⁸ Much of the travel cost literature has argued that the cost of leisure time is below the hourly wage rate. Cesario and Knetsch (1976) are credited with first having suggested approximating the opportunity cost (value) of time as a fraction of an individual's wage rate. The appropriate fraction to choose is the subject of much debate. According to Parsons and Massey (2003) the recreation demand literature has more or less accepted 25 per cent as the lower bound and the full wage as the upper bound. Following the literature we chose 25 per cent of the hourly wage as the opportunity cost of time as we believe that individuals may receive disutility from work and more importantly the transit time in getting to the recreational site produces many joint products. For instance, if the drive is particularly scenic, one has the benefit of this product or perhaps the transit time allows me to catch up with my driving companions. These additional benefits or products suggest that using a fraction of the marginal wage rate may be more appropriate.

estimation of the demand for whitewater kayaking in Ireland, using a case study of the River Roughty in County Kerry (Hynes and Hanley, 2006). With regard to the estimation of a travel cost model, the study found that the mean consumer surplus of the average kayaker using the Roughty river in Co. Kerry was €83.30 per day. The take out from this river requires the kayaker to cross privately owned farmland. The second study by Curtis (2002) estimated consumer surplus per day of €175 for salmon angling on rivers in Co. Donegal. Again this is an activity that frequently sees anglers crossing privately owned farmland. Such simple comparisons between discrete choice modelling studies are somewhat hard to interpret, since methodology and context vary greatly between these earlier studies and that reported here. Nevertheless these studies, along with the results presented in this paper, highlight how valuable access to farmland in Ireland is, for countryside pursuits.

VII CONCLUSIONS

This study has found that the mean willingness to pay (i.e. the consumer surplus + travel cost) of the average recreationalist using the commonage area in Connemara was €41.92 per trip. This result is conditional on the survey sample but still indicates the high value of this commonage site as a recreational resource. Average sample travel costs were €9.67 compared to the total value of €41.92. The estimate of gross economic value or total willingness to pay for recreation usage of the Roundstone commonage area in Connemara is €1.82 million per year. Given that consumer surplus is 77 per cent of total willingness to pay this would suggest that individuals receive a considerable benefit from commonage recreation in excess of their travel costs.

Although the results indicate the high value of the commonage site as a recreational resource there are a number of factors which may bias this value upwards. First, the previously mentioned omission of substitute sites from the analysis could have two effects. Omission of the travel costs to relevant substitute sites may result in bias in the estimated parameters. The direction of this bias would depend on the correlation between the travel cost variables for the Roundstone site and any excluded substitute site or sites. Any increases (decreases) in surplus from visits to substitute sites would have to be subtracted (added) to the surplus under the demand function for the Roundstone site to assess its 'true' value. Second, if the trip had more than one purpose, the site value may be overestimated. Of importance in this specific case is the fact that the beach and the site may in some instances be 'joint products'. Some people wanted to go to the beach and sunbathe, but they had to 'use' the commonage land in order to gain access to the beach. In these cases

not all of the value of the visit is attributed to the use of the commonage land. This suggests that the actual consumer surplus estimates may be overstated.⁹

This study is also limited in the sense that the sample size is quite small. While the results indicate that the value of Irish commonage recreation is high, further research is necessary on a larger sample taking into account the length of the trip taken by individuals and controlling for alternative sites. The preferences of recreationalists for alternative commonage sites as a function of site characteristics and individual characteristics should also be explored. It would also be interesting to investigate the impacts on welfare and trips of alternative rationing mechanisms such as the imposition of car-parking fees and measures to increase public access (see for example Shaw and Ozog, 1999 and Hanley *et al.*, 2000.)

Our estimates of recreationalist's welfare also suffer from many of the generic drawbacks of the travel cost model: for instance, that they do not include non-use values of the commonage site, and that our values depend on assumptions made about the value of leisure time and what should constitute the marginal cost of visiting. Omission of non-use values may be particularly important for commonage sites with unique scenic qualities or for sites of high cultural significance and will certainly bias any cost-benefit analysis based solely on recreation use values.

These limitations aside, considering the estimated value of Irish commonage as a recreational resource that has been presented here, due regard may be given in the future in the debate on the management and exploitation of Irish commonage sites and the associated argument on whether Irish farmers should be compensated for allowing the general public access to their land for recreational pursuits. It was interesting to note that over half of the respondents in the Bogue (2005) study were willing to pay a nominal charge to guarantee access to privately owned farmland. As one would expect, those who made the greatest use of the countryside for recreation, were most willing to pay a charge, indicating a greater appreciation for the valuable asset which is the countryside and also the need to protect the rights of landowners. The Bogue study did not place a value on the respondents' willingness to pay but as we have demonstrated in this paper that figure may be substantial.

The Roundstone commonage site is visited by thousands of people each year, drawn by the natural beauty of the farmed machair landscape. The local economy benefits greatly from this recreational tourism. The local shop keepers, hotels, guesthouses and catering businesses all reap commercial

⁹ In addition it should be noted that it was assumed that the sole purpose of the trip was to visit the Roundstone site. If the trip had more than one purpose, the value of the site may be overestimated.

benefits from the attraction of the farm commonage site to outdoors enthusiasts and yet the local farmers who are responsible for maintaining the commonage site receive little direct benefit. Indeed in many cases they face extra costs and constraints because of the commonage's popularity. There is also the compliance costs related to the increasing burden of regulations such as the Commonage Framework, Cross Compliance, the Rural Environment Protection Scheme, the Nitrate Directive and the Water Framework Directive.

Ensuring that the future of rural recreation is sustainable requires ensuring that trail or other recreation type developments on farmland do not adversely affect the production activities of farmers and also requires the recognition that there are costs involved for farmers in giving recreational access to their lands especially where there is a need to maintain trails, signposts and information boards. This recognition could perhaps be most easily given through payments to landowners under rural development programmes or as supplementary payments under agri-environmental schemes such as The Irish Rural Environment Protection Scheme (REPS) which has been in operation in Ireland since 1994.¹⁰ While it can be argued that there is considerable direct payments (now consolidated in the Single Farm Payment) which European farmers already receive from the taxpayer in return for acting as "custodians of the countryside" these payments relate to farm production activities and under Council Regulation (EC) No. 1782/2003 a requirement to maintain land in good agricultural and environmental condition. They are not intended to cover the costs of maintaining trails, stiles, signposts, etc. for recreationalists using the farmland. To this end additional resources should be made available to ensure that the potential for increasing countryside recreation in Ireland, and similarly increasing tourism activities related to recreation, is done with due regard to the landscape, the visitor experience and perhaps most importantly the farmers who own and work the natural resources.

¹⁰ The Rural Environment Protection Scheme (REPS) was introduced in Ireland under EU Council Regulation 2078/92 in order to encourage farmers to carry out their activities in a more extensive and environmentally friendly manner. The first Five Year Rural Environment Protection Scheme (REPS) included a provision that farmers who permitted public access could receive an extra grant (Supplement 5). The payment was conditional on the access being to a specific route or area which must be agreed with a Local Community Body or a Local Authority. Also the farmer was responsible for maintaining the route/area. In an extraordinary decision, the EU held that Supplement 5 of REPS in practice did not fit into the Scheme objectives, i.e. farmers receive a subsidy in exchange for farming environmentally, when it is less financially rewarding than farming commercially. The EU concluded that Supplement 5 was simply "Paying for Access" which was contrary to EU policy. Hence REPS has not included an Access Supplementary measure since 1999.

As we have demonstrated in this paper, recreational demand and accompanying economic values associated with the recreational use of Irish commonage is significant. But there is a linkage between recreational demand and a managed landscape provided by grazing livestock systems which underscores the importance of agricultural and rural development measures which support farming communities. Agricultural abandonment of commonage would change this landscape. This has already been sighted as a danger in a decoupled policy environment (NUI Maynooth *et al.*, 2005). To maintain the farming landscape in the condition that outdoors enthusiasts expect when they visit the countryside for recreational pursuits, policy instruments will be required which integrate agricultural concerns with those of recreational demand on privately owned farmland.

REFERENCES

- ANGUS, S. and M. ELLIOTT, 1992. "Problems of Erosion in Scottish Machair with Particular Reference to the Outer Hebrides", in R. W. G. Carter, T. G. F. Curtin and M. J. Sheehy-Skeffington (eds.), *Coastal Dunes: Geomorphology, Ecology and Management for Conservation*, Rotterdam: A. A. Balkema, Rotterdam, pp. 93-112.
- BASSETT, J. and T. CURTIS, 1985. The Nature and Occurrence of Sand Dune Machair in Ireland. *Proceedings of the Royal Irish Academy*, 85B, Dublin pp. 1-20.
- BERGIN, J. and M. O'RATHAILLE, 1999. *Recreation in the Irish Uplands*. Dublin: Mountaineering Council of Ireland.
- BLEASDALE, A. and M. SHEEHY-SKEFFINGTON, 1995. "The Upland Vegetation of North-East Connemara in Relation to Sheep Grazing" in D. Jefferey, M. Jones and J. McAdam (eds.), *Irish Grasslands, Their Biology and Management*, Dublin: Royal Irish Academy.
- BOGUE, P., 2005. "Utilisation of the Countryside for Leisure: A Research Survey of Opinions". www.agriaware.ie
- BROMLEY, D. W., 1991. *Environment and Economy: Property Rights and Public Policy*. Oxford: Blackwell.
- BUCKLEY, B. and T. VAN RENSBURG, 2006. "An Analysis of the Financial Returns Associated with Commonage in Ireland", *Proceedings of the Agricultural Research Forum 2006*, Teagasc Publications, p. 64.
- BUTLER, V., 2000. "Upland Farming in the West of Ireland: The Tragedy of the Commons", *Environmental Studies*. Dublin: UCD.
- CAMERON, A. C. and P. K. TRIVEDI, 1986. "Econometric Models Based on Count Data: Comparisons and Applications of some Estimators and Tests", *Journal of Applied Econometrics*, Vol. 1, pp. 29-53.
- CESARIO, F. J. and J. KNETSCH, 1976. "A Recreation Site Demand and Benefit Estimation Model", *Regional Studies*, Vol. 10, pp. 97-104.
- CHAKRABORTY, K. and J. E. KEITH, 2000. "Estimating the Recreation Demand and Economic Value of Mountain Biking in Moab, Utah: An Application of Count Data Models", *Journal of Environmental Planning and Management*, Vol. 43, No. 4, pp. 461-469.

- CLINCH, J. P. and A. MURPHY, 2001. "Modelling Winners and Losers in Contingent Valuation of Public Goods: Appropriate Welfare Measures and Econometric Analysis, *Economic Journal*, No. 111, pp. 420-443.
- CRABTREE, B., J. POTTS and T. SMART, 2000. "Statistical Modelling of Incentive Design under Limited Information – the Case of Public Access to Farmland", *Journal of Agricultural Economics*, Vol. 51, pp. 239-251.
- CREEL, M. D. and J. B. LOOMIS, 1990. "Theoretical and Empirical Advantages of Truncated Count Data Estimators for Analysis of Deer Hunting in California", *American Journal of Agricultural Economics* Vol. 72, pp. 434-41.
- CURTIS, J.A. and J. WILLIAMS, 2002. *A National Survey of Recreational Walking in Ireland*, Dublin: The Economic and Social Research Institute.
- CURTIS, J. A., 2002. "Estimating the Demand for Salmon Angling in Ireland", *The Economic and Social Review*, Vol. 33, No. 3, pp. 319-332.
- DAVIS, J. and C. O' NEILL, 1992. "Discrete-choice Valuation of Recreational Angling in Northern Ireland", *Journal of Agricultural Economics* Vol. 43, pp. 452-457.
- IRISH DEPARTMENT OF AGRICULTURE AND FOOD, 2004. *Report of the Agri-Vision 2015 Committee*, Dublin: Ministry of Agriculture and Food.
- DUNNE, W. and J. J. O'CONNELL, 2000. "Public Good Issues in Direct Payments for Livestock Producers" in Proceedings of the Fifth International Symposium on Livestock Farming Payments, EAAP Publication No. 97.
- ENGLIN, J., and J. S. SHONKWILER, 1995. "Estimating Social Welfare using Count Data Models: An Application to Long-run Recreation Demand under Conditions of Endogenous Stratification and Truncation", *The Review of Economics and Statistics*, Vol. 77, pp. 104-112.
- FAILTE IRELAND, 2003, *Tourism Fact Card 2003*, Dublin.
- FAILTE IRELAND, 2004. *Hiking/Walking 2003*, Dublin.
- FITZPATRICK AND ASSOCIATES, 2005. *The Economic Value of Trails and Forest Recreation in the Republic of Ireland*, Wicklow: Coillte Publications.
- FONT, A. R., 2000. "Mass Tourism and the Demand for Protected Natural Areas: A Travel Cost Approach", *Journal of Environmental Economics and Management*, Vol. 39, No. 1, pp. 97-116.
- GREENE, W. H., 1993. *Econometric Analysis*. Second Ed. New York: Macmillan Publishing Company.
- GARROD, B., R. WORNELL AND R. YUELL, 2006. Re-conceptualising Rural Resources as Countryside Capital: The Case of Rural Tourism, *Journal of Rural Studies*, Vol. 22, pp. 117-128.
- GROGGER, J. T. and R. T. CARSON, 1991. "Models for Truncated Counts", *Journal of Applied Econometrics*, Vol. 6, pp. 225-238.
- HANLEY, N., G. KOOP and R. WRIGHT, 2000. "Modelling Recreation Demand Using Choice Experiments: Climbing in Scotland", Discussion Paper, Department of Economics, University of Glasgow 2000-11.
- HARDIN, G., 1968. "The Tragedy of the Commons. Science", Vol. 162, pp. 1243-1248.
- HELLERSTEIN, D. M. and R. MENDELSON, 1993. A Theoretical Foundation for Count Data Models, *American Journal of Agricultural Economics*, Vol. 75, pp. 604-11.
- HORSBURGH, R., 2003. "Shift from Single to Multi-Purpose Land Use". Summit to Sea Conference: The Values of Scotland's Mountains and Water in the 21st Century, Battleby, Scotland, January.

- HYNES, S. and N. HANLEY, 2006. "Preservation Versus Development on Irish Rivers: Whitewater Kayaking and Hydro Power in Ireland", *Land Use Policy Journal*, Vol. 23, pp. 170-180.
- LOOMIS, J., S. YORIZANE and D. LARSON, 2000. "Testing Significance of Multi-destination and Multi-purpose Trip Effects in a Travel Cost Method Demand Model for Whale Watching Trips", *Agricultural and Resource Economics Review*, Vol. 29, No. 2, pp. 183-191.
- LYALL, A., 2000. *Land Law in Ireland*. Dublin: Oak Tree Press.
- MARSDEN, T., 1999. "Rural Futures: The Consumption Countryside and its Regulation", *Sociologia Ruralis*, Vol. 39, pp. 501-520.
- McKEAN, J. and R. TAYLOR, 2000. "Outdoor Recreation Use and Value: Snake River Basin of Central Idaho". Idaho Experiment Station Bulletin -2000, Moscow, Idaho: University of Idaho.
- McKEAN, J. and R. WALSH, 1986. "Neoclassical Foundations for Nonmarket Benefits Estimation", *Natural Resource Modeling*, Vol. 1, pp. 153-170.
- NUGENT, F., 1995. "Managing the Upland Regions of Ireland" in D. Hogan and A. Phillips (eds.), *Seeking a Partnership Towards Managing Ireland's Uplands*. Proceedings of a Conference held in University College Galway, 13th-15th October, 1995.
- NUI MAYNOOTH, TEAGASC, UNIVERSITY COLLEGE DUBLIN, 2005. *Rural Ireland 2025 Foresight Perspectives*, NUI Maynooth Publication.
- OFFENBACH, L. and B. GOODWIN, 1994. "A Travel Cost Analysis of the Demand for Hunting Trips in Kansas", *Review of Agricultural Economics*, Vol. 16, No. 1, pp. 55-61.
- OSTROM, E., 2000. "Private and Common Property" in B. Bouckaert and G. De Geest, (eds.), *Encyclopedia of Law and Economics*, Vol. 1, Cheltenham: Edward Elgar.
- PARSONS, G. and D. MASSEY, 2003. "A RUM Model of Beach Recreation" in N. Hanely, D. Shaw and R. Wright (eds.), *The New Economics of Outdoor Recreation*, Edward Elgar Publishing Ltd.
- PHILLIPS, W. E. and M. TUBRIDY, 1994. "New Supports for Heritage Tourism in Rural Ireland", *Journal of Sustainable Tourism*, Vol. 2, pp. 112-129.
- SCARPA, R., S. M. CHILTON, W. G. HUTCHINSON and J. BUONGIORNO, 2000. "Valuing the Recreational Benefits from the Creation of Nature Reserves in Irish Forests", *Ecological Economics*, Vol. 33, pp. 237-250.
- SHAW, W. D. and M. OZOG, 1999. "Modelling Overnight Recreation Trip Choice: Application of a Repeated Nested Multinomial Model, *Environmental and Resource Economics*, Vol. 13, pp. 397-414.
- WANG, G., C. MACERS, B. SCUDDER-SOUCIE, T. SCHMID, M. PRATT and D. BUCHNER, 2004. "Cost Analysis of the Built Environment: The Case of Bike and Pedestrian Trials in Lincoln", *American Journal of Public Health*, Vol. 94, pp. 549-553.